tains a large amount of new information, and the whole work has been thoroughly revised.—In the new form in which Messrs. Henry Holt and Co. have published the fifth edition of Prof. Newell Martin's clearly-written work on "The Human Body," the book will probably meet with increased success. The work has been revised by Dr. George W. Fitz, and several chapters have been rewritten. The directions for demonstrations and experiments has been greatly enlarged and collected in an appendix. Many new illustrations have also been included. The volume is now published in the American Science Series, and it makes a text-book of convenient size on anatomy, physiology, and hygiene.—A fifth edition of Marshall and Hurst's well-known and widely-used "Junior Course of Practical Zoology," revised by Mr. F. W. Gamble, has been published by Messrs. Smith, Elder, and Co. The plan of the work has not been changed, but the chapters on technique have been recast, and a few alterations and additions have been made.

OUR knowledge of the molecular weights of inorganic substances is in great part derived from the classical researches of Victor Meyer and his pupils on vapour densities at very high temperatures. A few determinations of the molecular weights of inorganic salts have also been made by the boiling-point method, the most interesting conclusion obtained in this way being that cuprous chloride and bromide are represented by the simple formulæ CuCl and CuBr. In the current number of the *Gazzetta Chimica Italiana* the problem is attacked by N. Castoro by the cryoscopic method. A satisfactory solvent was found in urethane, in which a considerable number of inorganic substances can be dissolved. The lowering of the melting point was determined for silver nitrate and the chlorides of mercury, cobalt, copper, cadmium, zinc, tin, and manganese. Of these, cupric and cobalt chlorides had the double formulæ Cu_2Cl_4 and Co_2Cl_4 quite clearly marked; manganese chloride showed some tendency to the formation of double molecules; whilst the remaining salts gave figures closely agreeing with those calculated on the assumption of the simple formulæ.

THE additions to the Zoological Society's Gardens during the past week include a Long-tailed Marmot (*Arctomys caudatus*) from Gilghit, presented by Mr. A. H. McMahon; a Rough-legged Buzzard (*Archibuteo lagopus*), European; a Virginian Eagle-Owl (*Bubo virginianus*) from North America, presented by the Hon. Walter Rothschild, M.P.; two Common Herons (*Ardea cinerea*), European, presented by Mr. F. G. Bridgman; a Pale-headed Parrakeet (*Platycercus pallidiceps*), a Rose Hill Parrakeet (*Platycercus eximius*) from Australia, presented by Mr. W. F. Clayton; a Cockateel (*Calopsittacus novae-hollandiae*) from Australia, presented by Mr. Edward Hawkins; a Camboyan Turtle Dove (*Turtur senegalensis*) from Africa, presented by Mr. D. Seth-Smith; a Common Paradoxure (*Paradoxurus niger*) from India, presented by Mr. W. O. Sheppard; a Brazilian Tortoise (*Testudo tabulata*) from South America, presented by Mr. John Gordon; a Great Eagle Owl (*Bubo maximus*), European; two Black-backed Piping Crows (*Gymnorhina tibicen*), four Laughing Kingfishers (*Dacelo gigantea*), two Black Swans (*Cygnus atratus*) from Australia, deposited; two Yellow Conures (*Conurus solstitialis*) from Guiana, purchased.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN MARCH:—

March 3. 12h. 21m. Minimum of Algol (β Persei).
3. 13h. 5m. to 14h. 2m. Occultation of the star B.A.C. 5254 (mag. 5·4) by the moon.
6. 9h. 10m. Minimum of Algol (β Persei).
March 15. Venus. Illuminated portion of disc 0·644.
Apparent diameter 18″·2.
Mars. Illuminated portion of disc 0·922.
Apparent diameter 9″·7.
Jupiter. Apparent Polar diameter 38″·9.
16. Saturn. ,, ,, 15·4.
Outer minor axis of outer ring 17″·34.
20. 5h. 32m. to 6h. 50m. Occultation of 56 Geminorum (mag. 5) by the moon.
20. 8h. 50m. to 9h. 59m. Occultation of 61 Geminorum (mag. 5·7) by the moon.
20. 8h. Sun enters Aries. Spring commences.
24. 9h. 48m. to 10h. 47m. Transit of Jupiter's Sat. III.
24. 11h. Mercury at greatest elongation, 18° 36′ East.
25. 16h. 52m. to 17h. 45m. Occultation of *e* Leonis (mag. 5·1) by the moon.
26. 10h. 52m. Minimum of Algol (β Persei).
27. 10h. to 10h. 56m. Occultation of DM – 10°, 3570 (mag. 6) by the moon.
28. 9h. 57m. to 10h. 49m. Occultation of 83 Virginis (mag. 5·8) by the moon.
30. 11h. 59m. to 12h. 40m. Occultation of DM – 22°, 3989 (mag. 6) by the moon.
31. 13h. 11m. to 14h. 10m. Transit of Jupiter's Sat. III.

Mercury will be very favourably displayed as an evening star from about March 17 to 27. The times of his setting and the intervals by which he follows sunset are as under:—

1899	Sunset		Mercury sets		Interval	
	h.	m.	h.	m.	h.	m.
March 17	6	6	7	38	1	32
18	6	7	7	45	1	38
19	6	9	7	51	1	42
20	6	10	7	56	1	46
21	6	12	8	1	1	49
22	6	14	8	5	1	51
23	6	15	8	9	1	54
24	6	17	8	12	1	55
25	6	19	8	14	1	55
26	6	20	8	15	1	55
27	6	22	8	16	1	54

NEW NEBULÆ.—We learn from *Harvard College Observatory Circular*, No. 38, that Dr. De Lisle Stewart, who is in charge of the Bruce photographic telescope, has found recently an interesting group of nebulæ, hitherto unknown, on plates taken October 14 and October 20, 1898.

Comparison examinations of both plates show the presence on each of forty-six objects, which are given in a table showing their coordinates and a short description of each. The group is situated within the limits of right ascension 3h. 10m. to 3h. 50m (1900), and declination – 49° 50′ to – 53° 40′ (1900).

Of the whole group only two are identical with the nebulæ given in Dreyer's New General Catalogue, viz. N.G.C. 1311 and N.G.C. 1356. Four of the new nebulæ appear to be distinctly spiral. One is described as having a "bright elongated centre, and others as faint nebulous wisps in ellipses or spirals." Three are nebulous stars surrounded by nebulosity.

NEBULOSITIES OF THE PLEIADES.—For several years there has been some controversy between various authorities as to the real or spurious nature of certain wisp-like forms which are obtained on plates exposed on the region surrounding this star cluster. Prof. Barnard maintains that the appearances are due to real nebulosity, and supports his case by showing identical forms on various plates taken with widely different lenses and with varying exposures; while Dr. Roberts, who cannot find these markings on his plates, attributes them to surface markings due to sky glare or defects of the plates. Mr. H. C. Wilson, of Goodsell Observatory, Minn., supports Prof. Barnard's case by an article in *Popular Astronomy*, vol. vii. No. 2 (February), which he illustrates with three photographs of the region taken by himself. Two of these were taken with a camera of about 36 inches equivalent focus, the objective being a quadruplet six inches in diameter. One of the plates was taken in October 1894, with an exposure of 11h. 15m., the other in November 1898, with an exposure of 5h. 35m. The regions of nebulosity to which he draws attention are quite easily seen on the reproduction, lying chiefly to the north-east of the star cluster, and the boundaries of the hazy masses are exactly

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similar in the two plates. Moreover, the author states that the forms shown on his plates agree very closely with those obtained by Prof. Barnard in 1893; so that there being at least three photographs showing identical forms, the evidence is greatly in favour of their being true cosmical matter, as it is inconceivable that chance markings could exhibit such coincidences. To explain their absence on Dr. Roberts's plates, the author thinks that the atmosphere at Goodsell Observatory must be much clearer than is the case in England, giving as his reason the fact that the star images on his plates are much less surrounded by atmospheric glare than those of Dr. Roberts. Indeed, even with the long exposure of over eleven hours, the star discs are still easily discernible on the reproductions, showing that the observing conditions must have been extremely perfect.

Meteor Photography.—Those who may be interested in this branch of astronomy will find the illustrated description, by Mr. W. L. Elkin, of the apparatus used for this purpose at the Yale University of considerable value (*Astrophysical Journal*, vol. ix. p. 20, January).

The instrument consists of a long polar axis, driven by clockwork, and provided with means of attachment for from eight to twelve cameras round its circumference. The lenses used for this purpose are selected for their rapidity; hence we find that portrait lenses are in nearly all cases chosen. During the last November Leonid shower eight cameras were used with the instrument; six of these carried portrait lenses of from six to eight inches aperture and from twenty-seven to thirty-six inches focus, the remaining two being provided with lenses four inches in diameter.

It is, however, not indispensable to have an expensive clock-driven mounting, and for the same meteor shower a simpler apparatus was also used, having a wooden polar axis turned intermittently at intervals of ten minutes by means of a toothed wheel. By also displacing the axis slightly at each movement of the wheel, the successive star trails fell alongside each other, making a kind of time scale, which made it possible to refer any meteor trail to its position among the stars if the time of its appearance had been noted.

The article is illustrated by a photograph of the instrument in position at the observatory, and one of the successful plates showing a Leonid passing near Mars and the star-cluster Præsepe.

THE TRADE IN TORTOISESHELL.

Among the number of misnomers current in popular language, and more especially in that relating to natural history, few are more unfortunate than is the application of the term "tortoiseshell" to the substance which should properly be designated turtleshell, or perhaps rather turtle-skin. It is, however, far too late in the day to attempt a change; tortoiseshell it always has been, and tortoiseshell it will doubtless remain. In its manufactured state, whether in the form of inlaid buhl-work, as the handle of a fan, or as a comb, the translucent plates of tortoiseshell, with their rich mottlings of golden yellow and warm chestnut, are familiar to all. The particular species of reptile, or reptiles, from which it is derived, the part that it plays in the economy of these creatures, and the methods of the manufacture, to say nothing of the enormous volume of the trade, are, however, less matters of common knowledge.

To begin with, tortoiseshell, in the widest sense of the term, may be taken to include the horny superficial plates or shields overlying the bony case of the great majority of tortoises and turtles, although in the popular and trade sense it is restricted to those of the latter. Anatomically it corresponds to the scarf-skin or epidermis of the human integument, the underlying bony case or shell representing, to a great extent, the true skin. Turtles differ from tortoises, among other features, by the heart-shaped form of the upper half of the shell, or carapace, and the conversion of the limbs into paddles adapted for swimming. The upper part of the shell carries a median row of five large superficial horny plates, flanked on each side by a row of four or five still larger flat plates; these thirteen or fifteen large plates, affording some of the most valuable commercial tortoiseshell in the particular species whose "shell" is most in demand. On the front and hind edges of the upper bony shell and the portion connecting the latter with the plastron, or lower shell, are a series of smaller horny plates, generally twenty-four in number, which are sharply bent in the middle, and are known in the trade as "hoof." They form the least valuable portion of commercial tortoiseshell. The under surface of the shell of a turtle carries six pairs of large, more or less flat, horny plates, for which the trade term, derived from their uniform colour, is "yellow-belly." In value they sometimes exceed all but the very finest of the large upper plates, generally known simply as "shell." The term "shell" has thus a very different signification in commerce from that which it bears in natural history, where it is applied to the whole solid case of the reptile, including both the overlying horny plates and the subjacent solid bony structure.

Of the host of land and fresh-water tortoises, most of which are of comparatively small size, the horny plates (which, by the way, are altogether wanting in the so-called soft tortoises of tropical and subtropical rivers), on account of their thinness and opacity, are now of no commercial value whatever, at least in England.

Moreover, it is by no means all the species of marine turtles which yield commercial tortoiseshell. Of these marine turtles, exclusive of the great leathery turtle, which has no horny plates at all, there are three well-marked and perfectly distinct types, severally represented by the green, or edible turtle, the hawksbill, so named from the form of its beak, and the loggerhead. The latter, which is the largest of the three, taking its name from its huge ungainly head. Of the green turtle the plates are so thin and so badly coloured as to be of little or slight manufacturing importance, so that they do not apparently figure at all in the trade circulars of Messrs. Lewis and Peat. In this species the horny plates on the back, which have a dull pale brown ground-colour with streaks of black, meet together by their edges, like the tiles in a pavement, or the plaques in a mosaic. On the other hand, the much thicker and more beautifully-coloured plates on the back of the hawksbill, which afford the most valuable commercial shell, overlap one another like the slates on a roof during the greater part of their owner's life, although in very aged individuals they are joined by their edges. The largest and best plates, which are those in the middle of the sides of the back, are about a quarter of an inch thick in the centre, and measure about thirteen by eight inches; their weight being from about half-a-pound each to as much as one pound. Their translucency and beautifully mottled colours have been already mentioned. The lower plates, or "yellow-belly," on the other hand, are of a uniform golden yellow tint; while the connecting marginal plates, or "hoof," are partly plain yellow and partly mottled. In size the hawksbill is somewhat inferior to the green turtle; the length of the carapace being about thirty-two inches in the former, as against forty-two in full-grown examples of the latter. Both are found in all tropical and subtropical seas; and both resort to flat sandy shores for the purpose of depositing their eggs.

From a dead turtle the plates of tortoiseshell can be readily detached from the underlying bony framework by the application of heat. Sometimes boiling water is used, but more generally the whole shell is placed over a fire. In the West Indies one method, which may or may not be still in use, was to bury the whole shell in the ground for ten or twelve days, when the plates became readily detachable. It is stated, however, that the removal is too often effected by the cruel method of applying heat to the living animal, after which the unhappy turtle is returned to the sea to grow a fresh suit of plates. Formerly it appears to have been the custom to bore each plate of the upper shell, and to fasten together the whole series furnished by each individual turtle with wire or string; such bundles being sold together. Now, however, the samples offered at the London sales on string or wire are comparatively few, although the practice is maintained with Macassar and sometimes Ceylon shell.

In the trade circulars of Messrs. Lewis and Peat, hawksbill tortoiseshell is divided into the following geographical classes, viz.: (1) West India; (2) Zanzibar and Bombay; (3) Mauritius and Seychelles; (4) Singapore and Macasar; (5) Sydney and Fiji; and (6) Ceylon. Most of these classes are again subdivided into "shell," "yellow-belly," and "hoof"; while these latter subdivisions are again split up according to size, thickness, colour, and condition. Nos. 1 and 2 always send very arge imports; next come Nos. 4 and 5, which, however, exhibit very marked seasonal oscillations; while those of Nos. 3 and 6 are much smaller.

In order to ascertain how the trade of the present day in this

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